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PHOTOGRAPHY

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THE DOLLAR OUTFIT SCHEME.

THE photographic periodicals throughout this country, as well as abroad, have teemed time after time with warnings against photographic frauds of various kinds, a class of schemers who not alone strive to prey upon the professional photographer, selecting their victims from the larger class who think it unnecessary to subscribe to the current publications, but who, under the cloak of photography in some shape or form, seek to live upon the community at large—by misleading the innocent and swindling the ignorant.

The "something for nothing" swindler, the "crayon sharp," the "secret process" fakir, the organizer of protective schemes, have all received attention from the various periodicals, and in turn been unmasked, and with a single exception driven from the open practice of their nefarious pursuits.

There is another class of frauds, which for some reason seem to have thus far escaped the stinging blows of the editorial lash, —viz., the parties who largely advertise throughout the country to give away complete photographic outfits as a premium for a certain number of subscriptions, or else to send an outfit to anyone at a ridiculously low price.

One of these misleading advertisements, now before the writer, goes on to state that the outfit consists of

"A strong and perfectly made camera, which will take a picture 2½ inches square, complete with adjustable holder for plate and perfect lens with cap; a package of renowned dry plates; 2 japanned tin developing trays; 1 printing frame; 1 package blue process paper; 1

sheet ruby paper; 1 package photo mounts; hyposulphite soda; developing chemicals; complete and explicit instructions, enabling anyone to take any class of pictures with this outfit." It further reminds the gullible reader that they "are not restricted to any class of picture, but can take landscapes, portraits, buildings, in fact anything. The whole securely packed in a wood case for shipping. Be your own photographer. How many places of interest and friends that are dear do you encounter every day whose image you would like to preserve? With this outfit you can do it and almost without expense. It contains all the necessary materials. Price, only $1.00. Given for a club of eight subscriptions to *Pumpkintown Balloon.*

For the intelligent reader, comment is useless. With the general public, however, the case is different. As a rule, these advertisements only appear in gift-scheme blanket-sheets or country weeklies, using what is known as patent-pages or stuffing. Papers of both of these classes are designed for circulation exclusively within the rural districts, for the sole purpose of throwing out bait to the unsophisticated agriculturist, which is but too often greedily swallowed.

Two cases are recalled at the present writing, which came under our personal notice, and will serve as an illustration for the whole class of gift advertisements.

A retired preacher in a country village, whose attention was drawn to an advertisement similar to the above. The price then was two dollars, which was sent to the publishers. A few days later a letter was received stating that their stock of premium outfits was exhausted, but they could send him a much better outfit for five dollars, with which he could earn at least ten dollars per day. The balance of cash was sent. In return came a pasteboard, pinhole outfit, worth about fifty cents, with the information that the camera was warranted entirely free from spherical aberration. The four dry-plates sent were quickly exposed, with the natural result. A correspondence ensued, which ended with the advice not to be discouraged, but to wash the film off the glass, and recoat them, the instructions for which could be found in any good encyclopædia, and required no previous knowledge.

The other case, though not a photographic one, happened in the same community. In response to an advertisement in a

similar sheet, a hard-working laborer sent two dollars for a "perfect timekeeper," expecting, of course, to receive a good watch. Well, in about a week he received by mail a neat memorandum-book, about two by four inches. It contained sixteen pages, bound in pressboard. Two pages were headed with the name of each day of the week. The cost of the book was not over, say, thirty-six cents per dozen. Still it was a "perfect timekeeper." The swindle was even worse than that of the camera outfit.

The worst feature about the above advertisement is that the name of a reputable dry-plate concern is used prominently in connection with the fraud, a circumstance which is, without doubt, unknown to the company.

It is the duty of the photographic press to frown down everything of this character that is apt to mislead the public in regard to the photographic art, bearing in mind that the wider it is disseminated the better, but the aim should always be to advise and guide the prospective tyro to strive for practical results, which are not to be obtained through answering gift advertisements for bogus outfits. They can only be gotten with proper apparatus and chemicals, combined with practice and study.

—J. F. SACHSE.

Magic Picture.—This is the contrivance of F. Tschofen, of Vienna, Austria. It consists in of apparently blank piece of glazed paper or card or other suitable material, which, on being rubbed over with colored pencils or crayons, or with colored powder or the like, produces pictures or words—such as answers to questions—visibly printed above.

A piece of glazed paper, card, or other suitable material is inscribed with letters or words or pictures, preferably in outline, either drawn, written, or printed with a mixture of finely powdered chalk, water and gum arabic, or of any suitable mixture which is capable of imparting to the said lines a rough surface. Such inscriptions will, on being dried, be totally, or at least almost, invisible, but on rubbing the card, etc., thus prepared with colored crayons, powder, etc., the latter will adhere to the roughened lines, but not to the glazed surface of the card, thus bringing out the inscription or picture.—*Paper Mill.*

INDIVIDUALITY IN PHOTOGRAPHY.

BY H. P. ROBINSON.*

IN a recent number of *Blackwood's Magazine* an ingenious writer tries to show that the one thing more than another that now represents primitive man is the baby, and that the nineteenth century British baby differs very little from the savage child of, let us say, a couple of hundred thousand years ago, for a baby is nearly a quadruped and is a reckless creature devoid of conscience. It is, perhaps, a knowledge of the fact that babies are all alike that enables photographers, as it is libellously said, to make the negative of one of the species satisfy the yearnings of many mothers. Now photography is certainly somewhat like this view of the human race in the respect that its immature productions are all alike, and it is not until they grow up and acquire a conscience or soul that they differentiate and show individuality.

Of the immature there is no end, but a wise and invariable provision of nature checks over-production. Nature is always wise, but has no mercy:

> "So careful of the type she seems,
> So careless of the single life;"

and seeing that the world would be overwhelmed by immature photographs, sent beneficent fading to destroy them (always, as in other departments of nature, "so careful of the type," sparing a few, until the art grew old enough to possess a soul or conscience, and then permanent methods were given to us; and even now we sometimes feel inclined to paraphrase the wisdom of Mr. Whistler, and say modern photographs do not fade, and therein lies their deep damnation. This wonderful preservation of a few in all their prestine freshness is suggestive of special providence, for, according to the scientists, who are, of course, always right, like methods should produce like results, and not one of the old prints should have escaped.

Now, evidence of soul or conscience in a picture is art. Yet there are those who will not recognise that we have a soul, but, like Mr. Gilbert's mechanical figures in the *Mountebanks*, are only stuffed full of badly made machienry that sometimes runs down,

* Read before the Photographic Convention, Edinburg, July, 1892.

and always moves with a jerk; and I am not sure we are not suspected of trying to adopt the "put-a-penny-in-the-slot" business to the fine arts.

It is a favourite reproach with the opponents of photography as a picture maker that its results are all alike; it is one of the triumphant proofs of those who will not admit that photography is an art that the unthinking machine makes all its products to the same pattern; that there is no intrinsic evidence in any photograph of its maker. They will no more believe the plainest evidence to the contrary than those of old would believe the angels. They say we are mechanical, and it is of no use pointing out that this wild assertion is obviously untrue; we hear it over and over again, sometimes from one who knows that it is not true, at others from those who are simply ignorant and cannot learn. These are to be pitied. Then there are those whose purpose it serves to deny; and, worst of all, those who have tried, and altered their faith because they failed, those who, as the poet says, "fade away, and dying damn." To the credit of photographers there have been very few of these; however, we have lately had an exibition of one of them. A most enthusiastic defender of photography as an art of a few years ago, but who, perhaps, failed to prove it in his works, was politely asked to contribute to a recent exhibition, and is reported to have replied as follows—it is a lesson on the mutability of things to compare this letter with his former opinions—"I am fully persuaded that photography is not art nor can be, and to encourage exhibitions is to lead a lot of vain people to waste their time in the practice of a useless and vain pursuit."

It has no effect with the prejudiced critic to point out that, if different minds using the same machines produced like results invariably, as machines are expected to do, any one of them who understood the machine ought to be able to turn out a series of masterpieces equal to the best that have ever been produced, always providing, of course, that one machine was as good, and as well brass-bound and French-polished, as the other. Yet they continue to say—and this is one of the latest utterances of science —"The picture painted by the artist is a transcript of his own emotions, but a photograph is not a reflex of human emotions at

all—unless, indeed, accidentally so—but is a direct reproduction of nature, and only through science the offspring of man." We must be grateful to the writer for allowing us the accident.

I am quite ready to confess up to a certain point, and in the hands of the ninety per cent. of the followers of the art who are not good artists, the photograph is in the process; but with the others the picture is in the man (as in painting, only in a less degree, and as far as the materials will allow). The process takes a very subordinate place, and is dominated by the taste, thought, and feeling of the artist, when an artist uses it with what may be fairly called emotional results. Who has not laughed with many of Rijlander's characteristic heads, or wept—yes I have seen even that emotional result produced by a photograph (which was not an accident)—and it is an important part of my argument that all these emotions arose first in the mind of the photographer, and would never have been originated by the same models in the hands of another photographer.

Of all the attempts made to prove that photography was not an art, that which would have most force, if proved, would be that it showed no evidence of individuality; but, on the other hand, if the possession of that quality were proved, it would be one of the strongest arguments in favor of the admission of photography to the brotherhood of art, for individuality in its products necessarily implies the operation of a directing mind behind the "soulless camera."

The latest of the many attempts to define the meaning of the word "art" is a very remarkable one. It is said to be "the apparent disproportion between the means employed and the end obtained." And, as an illustration, the following explanation is given, at which, I think, many a practical photographer will smile.

"Admit, for argument's sake, that a photograph reproduces with a fidelity far beyond anything that the hand of man can attain to, it must still be allowed that the means used to attain this end are infinitely more complicated than the few hairs tied to a stick which the artist uses. Indeed, it might be argued that, if *art* is the apparent disproportion between means and end, photography is not art at all, but science. There is no art on the part of the

lens when it produces its images; it does so strictly in accordance with natural laws. The developer acts as thoughtlessly as any other chemical experiment, and these are the chief factors in every photograph. It is true, you have one small part to play—you must have the *art* of exposing properly; but even here a few shillings will purchase for you a machine to do even this. I do not admit art in development. Art in development is only called in when the exposure has been made without art, and as I have already allowed art in exposure, I cannot allow it here again. With such an infinitesimal part of the picture the outcome of art, is it honest to call a photograph a work of art?" Are we to understand from this singular piece of reasoning that painting is an art because the painter uses "a few hairs tied to a stick?" and does the writer suppose that we claim photography as an art because of its fidelity—that heritage of the youngest amateur? This curious example of scientific knowledge of art is by Dr. J. K. Tulloch, of Dundee, and was written in the present century.

Some writers get confused between degree and kind. In an article in the *Magazine of Art*, a certain writer, who was once a photographer, endeavors to show that photography cannot become art, because its individuality is limited. That it is more limited than painting has always been admitted—we cannot get so far away from the truth as is the painter's privilege—but it is also admitted that all methods of art are more or less limited, and the amount of limitation is only a matter of degree, not kind. The limitations add to the difficulty, but do not alter the status.

Let us run back a little and see if we can find a few workers whose results are totally different from those of their contemporaries, and this invariably. One of the earliest photographers to show genuine art feeling in his work was Rijlander. He died sixteen or seventeen years ago; yet, among many thousands of photographs, it does not require much experience to recognise a Rijlander. There is nothing in the manipulation to distinguish them, except, perhaps, carelessness. It was the mind of the man that was visible, you recognise the man beyond the process. There are still those living who can say, on looking at a collection of old photographs, This is a Francis Bedford, a Dr. Dimmond, a Teuton, a Delamotte,

a Le Gray or Silvy, a Wingfield or a Mrs. Cameron, certainly quite as accurately as an expert in painting would say, This is a Raphael, or Titian, or a Correggio. Then, what becomes of the machine argument?

I will now endeavor to put it another way. Photographs, as I have endeavored to prove, show the mind of the producer—when he has a mind to show; and given two equally gifted photographers, as far as equality can be measured, the one could not produce even a colorable imitation of the work of the other. Neither could dismiss his individuality, let him try how he may. Take two representative men, Rijlander and Bedford:—neither of these accomplished photographers could have imitated the other. They had both original minds, and followed the bent of their genius, and their hands, as well as brains, showed in every picture.

Among the workers of the present day, I could point to dozens of well-known instances, but one or two must suffice. No man's work has been more imitated than that of M. Gale. In every exhibition he is intimated in size, style, framing and signature, yet an expert can decisively say of two pictures, this is Gale, and this the imitation; he can even distinguish between the imitators and say, this is a —, and this a —.

Then in a very different style, there are works of our much respected President, than whom there is no one I would prefer to see occupy the honorable position which defective health compelled me to decline. Perhaps I am not a fit and proper judge of his pictures, but, without altering my opinion of what a photograph should be, I must confess that some of them have captured my admiration for their beauty and respect for other ways than my own when in good hands. Now, some have endeavored to imitate Mr. Davison, and some have renounced photography in despair, because they could only reach the eccentricity without touching the excellence. It is easy to put the image out of focus, but not so easy to make a picture by that means, and Mr. Davison makes pictures. It is easy to copy peculiarities, but not so easy to imitate valuable essentials.

While on the subject of our President, may I be permitted to add—for he is now in a public position and open to our shots—

that, however straitened his views of the practice of photography as an art may have been at one time, his opinions have constitutionally broadened down, until now the key-note of his teaching is liberty for all.

We now come to another proof of individuality. It used to be the practice to insist on unanimity at exhibitions until after the judges had done their work; but this was given up when it became apparent that the judges usually recognised the work of the old hands, and the only nameless ones were new exhibitors. In America—at least, at the Convention Exhibition—the farce of the anonymous is still carried to such an extent that nobody seems to know, officially or otherwise, who the pictures are by until it is to late to be of any use to the exhibitors; and newspaper criticism has to be published without names. For, however the photographs may proclaim their authors, it seems to be etiquette to pretend not to know.

The difference between the works of some of our best photographers and those of the moderately successful can scarcely be due to a scientific cause, except, indeed, to a reversal of the generally received idea; for I think, if the truth were known, it would be found that the producers of the indifferent pictures had much more scientific knowledge than those who produce the most artistic pictures. I am acquainted with a great many of our photographers, but I do not know one of those to whom we are accustomed to look for the chief ornaments of our exhibitions who has any elaborate scientific knowledge. Indeed, their technical methods are so very simple as to seem quite elementary. They usually take a plate of the make to which they are accustomed, a simple pyro and ammonia developer, a handful of hypo and a jug of water, and use them properly; and that is all. They do not bring science to bear even on the exposure at the expense of "a few shillings." They get on without an actinometer. They feel from experience when their plate has had enough, and an actinometer, however perfect, would only confuse them. But, as they endeavor to put taste, thought, and feeling into their pictures, their works necessarily differ from those of the scientist, and the essence of their art is individuality.

My last word must be a word of caution. Be original, be unique if you can, but do not be out of harmony. Individuality goes wrong when it is out of harmony with its surroundings. Eccentricity is very easy, but it does not last. It is open to the meanest capacity, and is often assumed by it; but genius, to be useful, should consist of individuality, backed up by suitability to its environments.

PHOTOGRAPHY FOR THE BUSY MAN.

BY XANTHUS SMITH.

IN one's peregrinations with their camera they are frequently addressed by friends and others with questions relative to the art of photography, and the impression given, in the majority of cases, is that the questioner has a strong interest in the subject, and a decided hankering to attempt the art of taking pictures, but is prevented by the belief that the process is a decidedly difficult one to learn; that in the mere matter of securing a good outfit he may go astray in the very beginning, and, therefore, stands deterred from any attempt whatever to take up the pursuit.

Apart from the professional branch of the art, which is carried on of course as a means of livelihood, the amateurs consist to a considerable extent of the young, who rush thoughtlessly into anything to which their inclination draws them, and of those of large means and ample time, who at the outset feel that they may make the venture, and, should the result be failure, the loss will not be felt. Now there is a large, mature, thinking class who would gladly avail themselves of the uses and pleasures of photography did they not feel completely debarred by the imaginary difficulties. On first turning their attention to the subject, these obstacles prevent themselves: the uncertainty about selecting an outfit from the many offered, the seemingly unfathomable mystery of exposure, development and printing, and the fear of laying themselves open to criticism and ridicule in the matter of artistic selection and effect. So much is this the case with a certain class, who would make the very best recruits to the delightful pursuit of amateur photography, that we only wish we could

reach them all, and, by a little advice and assistance, quickly prove to them how frail are the barriers which appear to intervene between them and success in this most agreeable and instructive occupation.

Let us group together briefly the main points in photography.

The depicting of objects in nature is an innate quality of man —as we see manifest by the rude attempts of savages to portray that which is of interest to them,—and with the advancement of civilization the fine arts advance, and of course the interest in art. We all know what an important part, and how largely attended, are the fine art portions of the great world's fairs that are held from time to time. Everyone, it would seem, is more or less interested in pictures representing scenes and incidents in nature. Art is various, and we may almost say prolific, in its means of representation. One of its means is photography, and photography we may truly say is a means open to every one. Why, therefore, should any one hesitate to avail himself of this means of deriving enjoyment and conveying it to others? The photographic art, as at present practiced, would seem to have been arranged completely for the benefit of the amateur—so simple is it in its practice. What do we require? A camera; one just suited to our means. Excellent work may be made with some of the quite inexpensive ones. A good lens, a 5x8 rapid rectilinear, will accomplish a vast deal. Three or four flat dishes, a few simple chemicals, and some dry plates, as the ready-sensitized plates are called,—little else than this. Our camera and its appurtenances are of course good, if taken care of, to be laid away indefinitely, and brought forth at any moment. The chemicals and solutions keep indefinitely, and the dry plates keep for years, either before exposure or after exposure. Now, what more could be asked by one who wishes to carry on a pursuit at intervals only?

If your means are limited, do not attempt too much. Let your work be of moderate size. In England it is very common even with skilled amateurs to work the 3¼x4¼ size, though we would not counsel working so small. Practice deliberation in your work. Do not feel necessitated to be continually exposing

your plates, as by careful consideration you will be better instructed by what you do, and derive more lasting pleasure from your productions.

The professional man, the business man or the clerk may find time to practice a recreation of this sort, which may be dropped at any point and resumed again when opportunity arises, and his work will take the direction of his particular bent.

As general viewing upon excursions or tours is one of the most fruitful sources of pleasure in amateur photography, we will offer some hints in this direction.

Grouping and light and shadow are the two principal art qualities to be looked after in photography. Therefore there should always be a principal aim or group in whatever subject may be attempted, and all else in the picture should as far as possible be subservient to this. The light and shadow should be so arranged as to bring out the principal group to the best advantage. If the light is too much back of the group the latter will be buried in shadow, and will sink in and appear dull and heavy, instead of standing out brilliantly, as it should do, and if the direction of the light is altogether from in front, the group will appear weak and flat. Try always, as far as possible, to secure a quiet background and surroundings to the main group. Ill-shapen patches of light and dark scattered about are ruinous to a picture.

Water scenes in landscape, either river or lake, with fine foliage and distant mountains, of course go to form the choicest that is to be had in the way of subject, and in working in such a locality, when you can get varying groups on either side, with open distance in the centre, backed by hills or mountains, the water coming in through the middle foreground, with reflections, and some immediate foreground, earth and rocks or other appropriate frontage, you are sure of securing beautiful and interesting pictures.

Such scenes as those just spoken of do not require figures or animal life. The repose or solemnity of them would be disturbed by the introduction of such accessories. When we come, however, to small domestic scenes and picturesque bits, the case is different, and if we can be so fortunate as to secure appropriate

figures, our work will be much improved. Creek scenes, meadows with willows and borders of woods, are greatly improved by the presence of cows in the foreground, especially if they be picturesque cows, some light and some dark, and not too much scattered, so as to make confusion. The points of light and dark give point to the work. Single figures, especially if standing, come badly into a picture. There should be two or more, and grouped, some sitting or reclining.

Always try to look at your intended subject as a picture before you begin, considering the very best point of view. In using any of the detective cameras, the finder will be found very useful for determining quickly what will make a picture-like arrangement and what will not, and avoid taking trifling subjects, for what may seem like sport at the time will end in disappointment after the trouble and expense of developing and printing have been considered, and it is seen how useless the resulting work has turned out.

When a busy professional man or man of business brings forth his album for criticism, it is always a matter of gratification to us, for, if he have any natural taste at all, we are sure to be pleased by the sight of some nice, and often very original, effects, and what we may say in praise of them is of course a matter of satisfaction to him. Is not this a sort of oasis in the desert of dry law papers or bulky ledgers?

We say to all who have any interest whatever in art, Do not hesitate. Secure an outfit at once and go to work.

Wanted—A crown for the brow of a hill.
Wanted—A snug-fitting shoe for the foot of a mountain.
Wanted—Several hundred women to scour the country.
Wanted—An energetic barber to shave the face of the earth.
Wanted—A lady to wear the Cape of Good Hope.
Wanted—Locks for the Florida Keys.
Wanted—A wise man to teach the Scilly Islands.
Wanted—Some one to love the River Darling.

AN IMPROVED METHOD OF TREATING RESIDUES.

The time-honored method of adding salt—common kitchen salt—to the washings from silver prints is always difficult to displace by improved methods; still, as the ever-increasing pressure of competition causes every professional photographer to seek means of increasing his income, it may yet be that, if he see any distinct gain, he will throw aside prejudice, and take up new plans promising gain. At the outset we may say that chloride of sodium is a very unsuitable precipitant for two potent reasons. In the first place, every printer of experience knows that, when the silver is precipated in the ordinary way, a very long time has to elapse before the traces of chloride subside; it is necessary to have vessels to be used in succession, so that the one first filled may have cleared sufficiently to be ready to empty by the time the rest are full. If this be not done, the liquid run off is "milky," in other words, contains a quantity of finely divided chloride of silver in suspension, and this goes down the sink and is wasted. Secondarily, though the liquid may be quite clear, there is yet a considerable waste; for solution of chloride of sodium dissolves an appreciable amount of silver chloride, and to the extent of this solubility must loss accrue. If any one entertain any doubt on this point, let him very carefully filter a portion of the clear liquid standing over the precipitate, and add it to one drop of the solution of liver of sulphur, which he uses for throwing down silver from the hypo. The considerable discoloration produced is irrefragable evidence of the presence of silver.

Both these objections may be removed by using hydrochloric acid. The impure acid—the muriatic acid of the dry-salter—will suffice. It does not dissolve the silver salt, and it causes the precipitation to be speedy, or perhaps we should say less slow, in falling, and is thus decidedly a gain in material and in time.

But even with this precipitant there is delay, and, where space is of importance, it cannot but be that some silver is wasted through insufficient time being allowed for sudsidence. We have, therefore, been making a series of experiments bearing upon this point, and have devised a method which seems to be all that can

be desired. Starting with a procsss employed in metallurgical operations, we first tried the effect of precipitating the silver as a bromide; but, try it how we would, no benefit resulted in any way commensurate with the increased expense this more costly salt involved.

Our next plan was to add to the washings some substance which would cause a more speedy falling of the chloride. After numerous failures, particulars of which need not be here recounted, we brought into use a soluble lead salt, which might be precipitated at the same time as the silver, and, perhaps, by virtue of its great specific weight, assist the silver to fall by enveloping the particles of silver chloride. This plan met with complete success. So far our trials have been merely on a laboratory scale, and thus not with a large bulk of liquid; but there is no reason to doubt that, when put into actual practice, it will act in a precisely similar way.

Taking a quantity of washings obtained from prints, to cause the laboratory conditions to, resemble as nearly as possible, printing-room work, and dividing it into a number of portions of equal bulk, we placed them in a series of test tubes. The first experiment was a mere tentative trial, but its success was evident. A few drops of solution of lead nitrate were added to one test tube and the precipitant added, a second tube having the same treatment, but with the lead left out. In number one tube the precipitate all sank to the bottom and left a clear liquid in less than a minute, while the second tube was milky half an hour afterwards, and no doubt would take a day or so to become quite clear. We next tried the effect of varying quantities, and we found that there was no gain whatever in increasing the proportions of lead salt beyond a certain small proportion. This proportion, as near as we can judge, would be about one-fifth of the silver salt present.

Next we ascertained the best form in which to add the chloride. The action was so prompt that it was needless to experiment again with bromides. The result was that, though hydrochloric acid was very quick in action, the ordinary table-salt solution was still better. It was then desirable to see whether a more easily

obtainable lead salt—the acetate—would answer. It was quite equal to the nitrate.

We were thus in a position at once to formulate a method for practical use. To each jar of print washing—say, of ten gallons—add a quarter of an ounce of acetate of lead—sugar of lead, it is commonly called—and when completely mixed, add the usual chlorine, either as "salt" or as "muriatic acid," stir for a little time, and allow to subside.

We are hoping that before long we may be able to say how the plan works in practice on a large seale, for Mr. Watmough Webster, who joined us in these experiments, has promised to introduce the method into his daily practice, for a time at any rate, and report the practical results attending what may be termed the lead method of precipitation.—*British Journal of Photography.*

Our Illustrations.—Frontispiece: specimens made on American Aristo paper, negatives from Dana's Brooklyn Gallery. This paper is a collodio-citro-chloride paper, made by the American Aristo Co., of Jamestown, N. Y. In our April JOURNAL (page 147) we referred at length to this paper, giving full working directions for the manipulation. The beautiful results obtained on this paper make it a desideratnm for the professional who keeps abreast of the times.

Our Extra Illustration.—A reproduction in half-tone of one of the earliest if not the very first daguerreotype miniature ever made in a studio, it having been made by Robert Cornelius in his studio, Eighth & Lodge Alley, February, 1840. Reference to this picture is made in the Historical Retrospect of Early Daguerrotype Days, on page 312 of the JOURNAL.

The *Public Ledger* of August 11th, published a summary of our history of the Dawn of Photography, and on August 13th gave us the following editorial notice:

"THE AMERICAN JOURNAL OF PHOTOGRAPHY continues the story summarized in an article in the *Ledger* last Thursday on Early Photography, and makes further remarkable statements concerning the early development of the art in this city. The progress of photography has been very rapid, and always Philadelphia and Philadelphians have been in the first ranks of those who have cleared the way."

SPECIMEN OF EARLIEST STUDIO PORTRAITURE.

TAKEN BY ROBERT CORNELIUS, FEBRUARY, 1840, AT STUDIO EIGHTH AND LODGE ALLEY, PHILADELPHIA.

NEGATIVE FROM ORIGINAL BY JULIUS F. SACHSE.

VIDE PAGE 312, 1890.

EARLY DAGUERREOTYPE DAYS.—IV.

AN HISTORICAL RETROSPECT.

BY JULIUS F. SACHSE.

(*Continued from page 362.*)

AN exception, however, was made in the case of Mr. Morse at the intercession of Hon. Robert Walsh, U. S. Consul at Paris. This was in the shape of a compromise—Daguerre showed Morse his pictures, and on the next day Morse explained to Daguerre his model of the telegraph and its workings. Daguerre, however, flatly refused to give Morse any insight whatever into the heliographic process.

By a curious coincidence, during Daguerre's two-hours visit to Morse, the former's house, containing his diorama, studio, and laboratory, together with all of his original heliographic results, were destroyed by fire.

Snelling, in his "History of the Art,"[6] states that on his return home [to New York], Prof. Morse waited with impatience for the revelation of Daguerre's process, and no sooner was it published than he procured a copy of the work containing it, and at once commenced taking daguerreotype pictures. At first his object was solely to furnish his studio with studies from nature, and before the year 1839 had expired Morse succeeded in obtaining a fair impression of a church building, from a window on the staircase of the old New York City University, the exposure being about fifteen minutes, and the manipulation strictly according to the published account.

These experiments led him into a belief in the practibility of procuring portraits by the process. Consequently during the spring of 1840 Morse made several attempts at portraiture for this purpose. Thinking that it was absolutely necessary to place the sitters in a very strong light, they were placed on the roof of a building in the full sunlight with instructions to keep their eyes closed during the exposure, which lasted from twenty minutes to half an hour.

[6] New York, 1849, p. 8.

When Morse made his first crude attempts at portraiture cannot be definitely stated, in view of conflicting claims and dates given by various authorities. But it was long subsequent to Cornelius, Goddard, and others.

Personally Morse never pressed the claim of having made the first portrait. In a letter to Henry H. Snelling, published in the work before mentioned, he states :[7]

"If mine were the first, other experimenters soon made better results, and if there are any who dispute that I was first, I shall have no argument with them ; for I was not so anxious to be the *first* to produce the result, as to produce it in any way. . . . I lay no claim to any improvements."

Some time during the year 1840, Professors Draper and Morse joined interests, and had a glass building constructed for heliographic portraiture on the roof of the University. In September, 1840, Professor Draper sent a paper to the London *Journal of Science*, describing "The Process of Daguerrotype and Its Application to Taking Portraits from the Life,"[8] in which he states:

"On a bright day, and with a sensitive plate, portraits can be obtained in the course of *five* or seven minutes. The advantages which might be supposed to accrue from the features being more composed, and of more natural aspect, are more than counterbalanced by the difficulty of retaining them so long in one constant mode of expression.

"But in the reflected sunshine, the eye cannot support the effulgence of the rays. It is therefore absolutely necessary to pass them through some blue medium, which shall abstract from them their heat, and take away their offensive brilliancy. I have used for this purpose blue glass, and also ammoniaco-sulphate of copper, contained in a large trough of plate glass, the interstice being about an inch thick, and the fluid diluted to such a point as to permit the eye to bear the light and yet to intercept no more than was necessary. It is not requisite, when colored glass is employed, to make use of a large surface ; for if the camera operation be carried on until the proof almost solarizes, no traces can be seen

[7] History of the Art. H. H. Snelling, New York, 1849.

[8] Vol. XVII., p. 223.

in the portrait of its edges and boundaries, but if the process is stopped at an earlier interval, there will commonly be found a stain corresponding to the figure of the glass.

"Different parts of the dress, for the same reason, required intervals differing considerably to be fairly copied, the white parts of a costume passing on to solarization before the yellow or black parts have made any decisive representation. We have therefore to make use of temporary expedients. A person dressed in a black coat, and open waistcoat of the same color, must put on a temporary front of a drab or flesh color, or by the time that his face and the fine shadows of his woolen clothing are evolved, his shirt will be solarized, and be blue, or even black, with a white halo around it. When, however, the white parts of the dress do not expose much surface, or expose it obliquely, these precautions are not essential; the white shirt collar will scarcely solarize until the face is passing into the same condition.

"Precautions of the same kind are necessary in ladies' dresses, which should be selected of tints contrasting strongly.

"It will be readily understood that the whole art of taking daguerreotype miniatures consists in directing an almost horizontal beam of light, and through a blue colored medium, upon the face of the sitter, who is retained in an unconstrained posture by an appropriate but simple mechanism at such a distance from the background, or so arranged with respect to the camera, that his shadow shall not be copied as a part of his body; the aperture of the camera should be three and a half or four inches at least,—indeed the larger the better, if the object be aplanatic.

"Miniatures procured in the manner here laid down are in most cases striking likenesses, though not in all. They give, of course, all the individual peculiarities—a mole, a freckle, a wart. Owing to the circumstances that yellow and yellowish-browns are long before they impress the substance of the daguerreotype, persons whose faces are freckled all over give rise to the most ludicrous results,—a white, mottled with just as many black dots as the sitter has yellow ones. The eye appears beautifully, the iris with sharpness, and the white dot of light upon it with such strength and so much reality and life as to surprise those who have never

before seen it. Many are persuaded that the pencil of the painter has been secretly employed to give this finishing touch."

A curious feature about this combination of Draper and Morse at the New York University, was that from the very start they gave *instructions* in the art.[9] Surely an illustration of the blind leading the blind, when it is taken into consideration that all accelerating mediums were unknown to the *learned* instructors.

The combination, however, did not last very long. Professor Morse, in a letter in possession of the writer, dated February 10th, 1855, thus explains his connection with professional portraiture:

"Professor Draper's other duties calling him away from the experiments, except as to their bearing on some philosophical investigations, which he pursued with great ingenuity and success, I was left to pursue the artistic results of the process, as more in accordance with my own profession. My expenses had been great, and for some time (five or six months) I pursued the taking of portraits by daguerreotype, as a means of reimbursing these expenses. After this object had been obtained, I abandoned the practice to give my exclusive attention to the telegraph, which occupied my whole time."

A xylographic copy of one of Morse's studio efforts has come down to us, and shows some effort at artistic posing. It is printed from the original engraved block made from the daguerreotype miniature. The time of exposure was about twenty minutes

From the fact that in the original the eyes were tolerably well defined, there is a strong supposition that for part of the time the young women opened their eyes to see what was going on. Consequently, when the illustration was engraved the figures were represented with open eyes, the engraver also remedying other defects of the original.

[9] *Fine Art Journal*, December, 1854, p. 382.

A Xylographic of an Early Daguerreotype, by Morse.

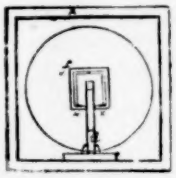
By a comparison of the facts here presented, it will be apparent to the reader that the experiments and results obtained by these two scientists up to this period were of little or no practical value in the development of heliographic portraiture in comparison with those of Cornelius and Goddard in Philadelphia.

The First Photographic Patent.

Some months after the Cornelius Atelier for daguerreotype miniatures had been successfully established in Philadelphia, an attempt was made by Alexander J. Wolcott and John Johnson to open a similar establishment in New York city, in the granite buildings at the corner of Broadway and Chambers streets.

Wolcott, who was a dentist, it seems had commenced to experiment with the Daguerre process, and had succeeded in obtaining pictures on plates about three-eighths of an inch square.[10]

[10] Humphreys's Journal, Vol. II., 1851.



A. The box or camera, about 4 inches long by about two outside measure. B. The reflector soldered to a brass screw, and mounted in the rear of the box. C. The slide to regulate the focus to the plate-holder. d. The standard to the plate-holder, screwed to the slide. f. The plate-holder frame, having two small ledges * * for the plate to rest upon. g. The plate resting upon the ledges * * and kept against a spring, h. The plates used were about *three-eighths of an inch square.*

Wolcott, who was of a somewhat inventive turn of mind, improved upon this toy, and constructed what he called a "reflecting camera," in which a reflector of eight inches diameter, with twelve inches focal distance for parallel rays, was substituted for a lens arrangement, the idea being that more light could be obtained. The reflector for this purpose was ground and polished by one Henry Fitz, Jr., who had some knowledge of practical optics.

An application for a patent on the apparatus was at once made, which was granted withou delay on May 8th, 1840. The specification of this invention, the first photographic patent granted by the United States, sets forth, viz.:

Specification of a Patent for an Improved Apparatus for Taking Daguerreotype Likenesses. Granted to Alexander S. Wolcott, City of New York, May 8th, 1840.

Be it known, that I, Alexander J. Wolcott, of the city of New York, and State of New York, have invented a new and improved method of taking likenesses from life, of which the following is a full and exact description. At one end of a box a concave reflector (which may either be a piece of solid metal, or of glass silvered) is placed, with the reflecting surface facing the other end, which has an opening corresponding to the size of the reflector. In this opening is a light metal frame, fixed by a thin support to a piece of wood or other material, with which it slides on the bottom of the box, in a direction perpendicular to the face of the reflector and length of the box. This frame is intended to carry the metallic plate, paper, or other material on which the impression is to be made. The plate,

paper, or other material, may be retained in the proper position against the frame by a small spring pressing the plate, paper, or other material on the back, and between which spring and the frame the plate, paper, or other material is slid. A small door should be made on the top of the box for the purpose of observing the focal image. The box should be placed on a table or other support, at such height that the centre of the reflector may be as high as that part of the person which is intended to be in the middle of the picture. When a very small picture of the person is intended to be taken, the focus may be adjusted by a microscope, which may be introduced through a hole in the top or end of the box, or held by the hand at the doorway on the top. When the camera (that is, the box with the reflector) is to be used, the person whose likeness is to be taken should be placed in a chair, to which some suitable support for the head is attached, to enable him to remain perfectly still. The camera should then be placed with the open end immediately opposite to the person. A trial plate is then to be placed or put against the frame that stands in the open end of the box, and the focus adjusted by sliding the piece to which it is attached. The trial plate is then to be removed, and the plate, paper, or other material (prepared in any of the well-known methods for being acted on by luminous or other rays) put into its place, and allowed to remain as long as required to form the image. A convenient size for such camera would be as follows: The box inside, fifteen inches long, eight and a half inches high, and eight inches wide. Reflector, seven inches clear diameter, and twelve inches focus. The plate, paper, or other material, on which the picture is to be formed, is two and a half inches long by two inches wide.

For taking likenesses for breastpins, the reflector may be about two and a quarter inches diameter, and four inches focus, and all the other parts of the camera of proportionate size. That which I claim as my invention, and desire to secure by letters-patent, is the taking of likeness from life by the aid of a concave reflector, placed so as to receive the rays from the person whose likeness is to be taken, and converge them to a focus, on a prepared plate, paper, or other material, placed between the person and the reflector.

ALEXANDER J. WOLCOTT.

A great advantage which was claimed by Wolcott's invention over Daguerre's method, was that the concave mirror produced the *proof in its right position,—that is to say, not reversed.* This, however, was more than counterbalanced by the fact that

the size of the plate was limited, and that such parts as were distant from the centre were represented in a very confused manner.

It was shortly after the granting of this patent that the New York gallery was opened.

This attempt to shorten the Daguerre process by mechanical means, so as to adapt it for portraiture, practically proved a failure, nor was it successful until after a return to the Daguerre camera, combined with the use of bromine as an accelerator,—the secret of which was fraudulently obtained from an employé of Cornelius or Goddard, in Philadelphia.

A diligent search has failed to locate a single specimen of Wolcott's reflected portraiture.

Portraiture Abroad.

No sooner had the patent for Wolcott's reflecting apparatus been granted than John Johnson, his business partner, sailed for England with a few specimen portraits. On his arrival a joint arrangement was affected with Richard Beard, of London, in patenting and working the invention in England.

A portraiture studio was opened in the same year (1840). This was followed shortly afterwards by Claudet, who also opened a studio.

It will be seen that Europe was far behind America in the development of daguerrean portraiture. In France they were even more sceptical, and when it is taken into consideration that in France it took from twenty to twenty-five minutes to take a landscape, the observation of the French author is not to be wondered at, who describes the taking of portraits as "*toujours un terrain un peu fabuleux pour le Daguerreotype.*"

The first portrait obtained by the Daguerre process in France was a picture of the king, Louis Philippe. This was during the late spring or early summer of 1840. The operators were the two opticians, Lerebous and Claude. The exposure was made in the bright sunlight, upon a terrace of the Tuileries.

(*To be continued.*)

[11] Fotografitschesky Ejegodnik. P. M. Dementjew, St. Petersburg, 1892.

ELEMENTARY THEORY OF THE EQUIVALENT FOCUS. III.

BY PROF. HENRY CREW, LICK OBSERVATORY.

Geometrical Construction of Image.—For all practical purposes we may now consider the lens as consisting of its two principal planes, drawn at right angles to its optical axis. To find the place and size of the image, we shall not need to know anything concerning the optical properties of the glass or the curvature of the surface. In fig. 9, let p_1 and p_2 be the principal points; ab, the object; $a'b'$, the image.

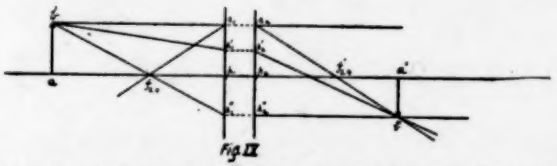


FIG. 9.—Illustrating the use of the principal planes in constructing images.

To find the image of any point b, draw the ray br, parallel to the axis. Since r_2 is the image of r_1, every ray which passes through r_1 passes also through r_2; and since the ray was drawn parallel to the axis, it will, on emergence, pass through $f'_{2,4}$. The ray br, after refraction, therefore, emerges in the direction $r_2 f'_{2,4}$. Since r_1 and r_2 are each points on the principal planes, and the one the image of the other, they will each lie at the same perpendicular distance from the axis. Since the principal planes are planes of unit magnification, the unit of r_1 is r_2, a point on the second plane determined by drawing $r_1 r_2$ parallel to the optical axis. The ray $r_2 f_{2,4}$ is therefore perfectly determinate. In like manner, the ray $b f_{2,4}$ is perfectly determined, since it emerges parallel to the optical axis and at the same distance from the optical axis at which the *incident* ray cuts the *first* principal plane. The point of intersection, b', is the required image of b.

In like manner, it may be shown that any other ray, br'_1, cuts the *second* principal plane at the same height at which it strikes the *first*.

It must not be forgotten that the diagram in fig. 9 does not give the actual direction of the ray *in* the second medium, or glass, but that it does give the true direction of the ray before the incidence and after emergence. This construction, it will be seen, is identical with that for a single refracting *surface*, except that in the case of a *lens* we must

consider each point on the surface as double and separated by a distance equal to that between the principal planes.*

Distance apart of the Principal Planes.—Eqs. 25 and 26 give us the distance of the principal planes from the corresponding principal foci; but one frequently wants to know the separation of one plane from the other.

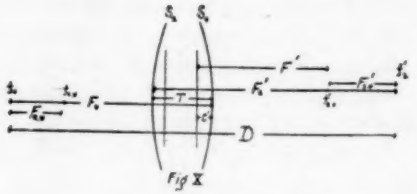


FIG. 10.

Let T be the thickness of the lens, then (fig. 10)

$$T - D = F'_2 - F_4$$

$$= \mu \left(\frac{R_2 - R_4}{\mu - 1} \right) \quad \ldots \ldots \text{Eq. 31}$$

The distance between the principal foci of the lens is

$$-F_2 - F_{2,4} + T + F'_4 + F'_{2,4}$$

or

$$T - F_2 + F'_4 - \frac{F_2 F'_2}{D} - \frac{F_4 F'_4}{D}$$

and, therefore, the distance between the principal planes, which we shall call H, will be

$$H = T - F_2 + F'_4 - \frac{F_2 F'_2}{D} - \frac{F_4 F'_4}{D} + F - F'$$

$$= T - F_2 + F'_4 - \frac{(F_2 - F'_4)\ (F'_2 - F_4)}{T - F'_2 + F_4}$$

* It will be seen from fig. 9 that any incident ray passing through p_1 will emerge from the lens in a direction which is parallel to its original direction and which passes through p_2. If the first and third media were always the same, this might be taken as a definition of the principal points. There are *always* two points which enjoy this property, viz., that an incident ray through one emerges in a parallel direction through the other; but when the first and last media have different refractive indices, these two points do not coincide with the principal points. They are called the *nodal points*, and include the principal points as a special case. This special case, however, is the only one ever met with in photography.

$$= \frac{T\,[T - F_2 + F'_4 - F'_2 + F_4]}{T - F'_2 + F_4}$$

$$= T\left[\frac{T - (R_2 - R_4)}{T - \mu\left(\frac{R_2 - R_4}{\mu - 1}\right)}\right] = T\,\frac{T - R_2 + R_4}{D} \quad . \quad . \quad . \quad . \text{ Eq. } 32$$

If this expression yields a negative value for H, as frequently happens with a "rectilinear" lens, we know that the incident ray strikes the *second* principal plane before it meets the *first*.

Distance of principal planes from surface of lens.—What the photographer most frequently wants to know is, how far the *second* principal plane is from the rear surface of the lens, because the equivalent focus is the distance from the second principal point to the ground glass. Let us call this quantity C', and the distance of the front surface (S_2) from the *first* principal plane let us call C. Then (fig. 10),

$$C' = F'_4 + F'_{2,4} - F'$$

$$= \frac{F'_4}{D}\,(D + F'_2 - F_4)$$

$$= \frac{F'_4 T}{D} = -\frac{R_4}{\mu - 1}\left(\frac{T}{T - \frac{\mu}{\mu - 1}\,(R_2 - R_4)}\right) \quad . \quad . \quad . \text{ Eq. } 33$$

In like manner,

$$C = \frac{F_2 T}{D} = -\frac{R_2}{\mu - 1}\left(\frac{T}{T - \frac{\mu}{\mu - 1}\,(R_2 - R_4)}\right) \quad . \quad . \quad . \text{ Eq. } 34$$

Eq. 33 tells us just how far away the back surface is from the point p_2, the point from which the equivalent focus is measured. C' is negative in nearly all lenses except a meniscus with the face of greater curvature than the back face.

Combination of Lenses.—In the ordinary photographic lens, however, we shall have to deal with a combination of lenses. Let us, therefore, proceed to find where the cardinal points of such a combination lie.

Consider two lenses centred upon the same optical axis *a a'*, fig. 11. We shall use the same notation that we have already used for two surfaces, with this difference only, that each surface will here be replaced by the two principal planes of the corresponding lens.

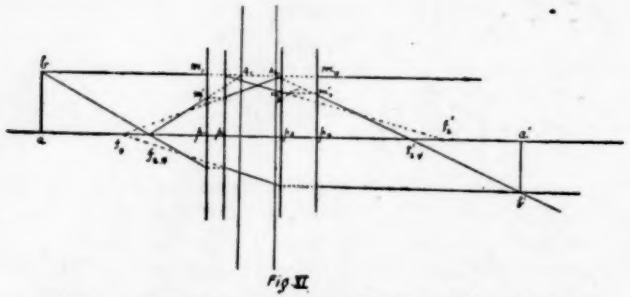


FIG. 11. Illustrating the cardinal points of the ordinary doublet.

Let p_1 and p_2 be the principal points of the first lens; p_3 and p_4 the principal points of the second lens; f_4 the principal focus of the second lens; $f_{2,4}$ and $f'_{2,4}$ are the first and second principal foci of the combination respectively: call the distance $a f_2$ (not marked in the figure), L_2; and $a' f'_4$ call L'_4, as before.

For the first lens we have, by Newton's rule,

$$L'_2 = \frac{F_2 F'_2}{L_2}$$

where L'_2 is the distance from the second principal focus of the first lens to the image produced by the first lens; and for the second lens,

$$L_4 = \frac{F_4 F'_4}{L'_4}$$

where L_4 is the distance from first principal focus of the second lens to the image produced by the first lens.

And since

$$L'_2 - L_4 = D$$

we have

$$D = \frac{F_2 F'_2}{L_2} - \frac{F_4 F'_4}{L'_4}$$

To obtain the position of the first principal focus of the combination, we have only to put

$$L'_4 = \infty$$

which gives

$$L_2 = \frac{F_2 F'_2}{D} = F_{2,4}$$

To get the second focus,

$$L_2 = \infty$$

$$L'_4 = -\frac{F_4 F'_4}{D} = F'_{2,4}$$

whence

$$\frac{F_{2,4}}{L_2} + \frac{F'_{2,4}}{L'_4} = 1 \quad \ldots\ldots\ldots\ldots \text{Eq. 35}$$

This expression is identical in form with that which holds for a single refracting surface.

By referring the conjugate points to the principal foci of the combination, instead of the foci of the separate lenses, one obtains, in like manner (see fig. 11),

$$K_{2,4} = L_{2,4} - F_{2,4}$$

$$K'_{2,4} = L'_{2,4} - F'_{2,4}$$

whence follows

$$K_{2,4} K'_{2,4} = F_{2,4} F'_{2,4} = -\frac{F_2 F_4 F'_2 F'_4}{D^2} \quad \ldots\ldots \text{Eq. 36}$$

Newton's rule holds, therefore, also for a *combination* of lenses: the only requirement being the usual one, that the conjugate points shall be measured from the principal foci of the combination.

Size of Image produced by Combination.—From similar triangles, fig. 11 (which corresponds in all respects to fig. 5, except that each point in the surfaces S_2 and S_4 has been doubled and separated), we have

$$\frac{I}{K_{2,4}} = \frac{p_1 m''_1}{p_1 f_{2,4}} = \frac{p_1 m''_1}{F_2 + F_{2,4}}$$

and

$$\frac{-I'}{F_4} = \frac{p_1 m''}{D + F'_2}$$

Eliminating $p_1 m''_1$, we have

$$\frac{I'}{I} = -\frac{F_4}{K_{2,4}}\left(\frac{F_2 + F_{2,4}}{D + F'_2}\right) = -\frac{F_4 F_2}{K_{2,4} D} = +\frac{K'_{2,4} D}{F'_4 F'_2} \quad \ldots \text{Eq. 37.}$$

Focal length of a Combination.—A combination of lenses has a pair of principal planes as well as a single lens. They are of similar importance and are defined in the same way. Making the image of the same size as the object and at the same time erect, we shall obtain the distance of the principal planes from their respective foci, and thus get the "*equivalent focus*" of the combination.

Let

$$\frac{I'}{I} = +1$$

Then, by Equation 37,

$$[K_{2,4} =] \; -\frac{F_2F_4}{D} = -F, \text{ say, } \ldots\ldots\ldots \text{Eq. 38.}$$

and

$$[K'_{2,4} =] \; +\frac{F'_2F'_4}{D} = -F', \text{ say, } \ldots\ldots\ldots \text{Eq. 39.}$$

Since $F_2 = -F'_2$ and $F_4 = -F'_4$, it is evident that the two focal lengths of the combination are equal, that is,

$$F = -F'$$

From the signs which we have given F and F', it will be evident that they are measured in a direction opposite to that of $K_{2,4}$ and $K'_{2,4}$, viz., from the principal plane to the focus, and *not* from the focus to the principal plane.

Position of the Principal Planes of a Combination.—For the sake of clearness, we shall first determine these geometrically; then, for the ease of computation, we shall obtain an analytical expression for their distance from each other and for their distance from one surface of the combination.

Draw, in fig. 11, any parallel ray, bm_1, emerging from the first lens and incident on the second; it will be directed towards f'_2: its point of incidence m'_2 is therefore determinate, hence also is m'_4, for $p_2m'_2 = p_4m'_4$. In the last medium the ray will pass through the principal focus, $f'_{2,4}$, and hence the direction of the ray, $f_{2,4}m'_4$, will be determinate. Draw the ray $f_{2,4}m'$, such that after refraction through both lenses it will coincide with bm_1. The point at which these two emergent rays intersect, r_2, will be a point on the second principal plane of the combination, for r_2 is evidently the image of r_1 and is at the same distance from the optical axis. The first principal plane of the combination is, therefore, that plane which passes through r_1 and is perpendicular to the optical axis; in like manner, the second principal plane passes through r_2 and is perpendicular to aa'.

Analytically, we have for the distance between the principal foci of the combination (fig. 11),

$$-F_{2,4} - F_2 + H_1 + F'_2 + D - F_4 + H_2 + F'_4 + F'_{2,4}$$

where H_1 and H_2 denote the distance between the principal planes of the first and second lenses respectively.

Let H denote the distance from the first to the second principal plane of the *combination.*

Then

$$H = (-F_{2,4} - F_2 + H_1 + F'_2 + D - F_4 + H_2 + F'_4 + F'_{2,4}) - 2F'$$

Let $W_{2,3}$ denote the distance between the second principal point of the first element and the first principal point of the second element, *i.e.*, the distance between p_2 and p_3, in fig. 11.

Then

$$D = W_{2,3} - F'_2 + F_4 = W_{2,3} + F_2 + F_4 \quad . \quad . \quad . \text{ Eq. 40.}$$

whence

$$H = H_1 + H_2 + W_{2,3} + F'_2 + F'_4 - \frac{(F_2F'_2 - F_4F'_4 - 2F_2F'_4)}{W_{2,3} + F_2 + F_4}$$

or

$$H = H_1 + H_2 - \frac{W^2_{2,3}}{F'_2 + F'_4 - W_{2,3}} \quad . \quad . \quad . \quad . \quad . \text{ Eq. 41.}$$

From Equation 41 it will be seen that if we combine two ordinary converging lenses the separation of their principal planes will at first diminish as $W_{2,3}$ increases. Presently when

$$H_1 + H_2 = \frac{W^2_{2,3}}{F'_2 + F'_4 - W_{2,3}}$$

the two planes of the combination coincide. H now changes sign and goes on increasing in value as $W_{2,3}$ grows larger. The principal planes have now passed by each other. Finally, when

$$W_{2,3} = F'_2 + F'_4$$

H becomes infinitely great, which means that one or both of the principal points are at infinity. This case is realized in the ordinary astronomical telescope, where the principal points of the combination made up of the objective and eyepiece are each at infinity. These two infinities, however, are not equal, but bear to one another the ratio of the focal lengths of the objective and eyepiece.

Distance of Principal Points from Surface of Lens.—Equation 33 tells us that the distance from the back surface of the combination to p_4, is

$$\frac{F'_4T_2}{D_2}$$

where the subscripts of T and D show that these quantities refer to the second lens.

It is evident that the distance from p_4 to the second principal point of the combination is $F'_4 + F'_{2',4} - F'$ which is easily transformed into

$$\frac{F'_4 W_{2',3}}{D}$$

where D is the distance between f'_2 and f_4. So that the total distance from the rear surface of the combination to the second principal point is the sum of the two preceding distances. Call this sum C'. Then

$$C' = \frac{F'_4 W_{2',3}}{D} + \frac{F'_4 T_2}{D_2}$$

or

$$C' = F'_4 \left(\frac{W_{2',3}}{D} + \frac{T_2}{D_2} \right) \quad \ldots\ldots \text{Eq. 42.}$$

C' is the correction which must be applied to the "back focus" to obtain the "equivalent focus."

(*To be continued.*)

World Fair Notes.—In front of the Administration Building at the Exposition, the largest fountain in the world will toss graceful streams and excite the admiration of millions of spectators. It is now being constructed in Paris by Sculptor MacMonnies, who is acknowledged to be one of the very best of living artists. The idea of the fountain is that of an apotheosis of modern liberty—Columbia—and will take the shape of a triumphal barge, guided by Time, heralded by Fame, and rowed by eight standing figures, representing on one side the arts, and on the other, science, industry, agriculture and commerce.

This barge is preceded by eight sea horses, forming a semi-circle in front, and mounted by eight young men as outriders, who represent modern commerce. The smallest figure is some twelve feet in height, and the largest twenty feet. The design of the basin is circular—150 feet in diameter—and is flanked on each side by columns 50 feet high, surmounted by eagles.

The water is furnished by a great half circle of dolphins in the rear and by a system of jets which entirely surround the barge and figures. At night the fountain will be illuminated by electricity after the principle employed in fountains in the Champ de Mars. Molders and other artisans are working day and night in getting this immense fountain ready in time.

FOCUSING AND THE USE OF DIAPHRAGMS.

BY JOHN CLARK.

IN cross-heading this article I have followed the order adopted by the publishers in their invitation to competitors, but as correct focusing depends to a large extent on the proper use of diaphragms or stops, I shall reverse the order, and deal with them first.

The photographic lenses in general use are of two classes, single and compound, and with both, stops are employed, although for very different purposes; in the first they are absolutely necessary, while in the second they are only used as a means of improvement.

A single lens, often spoken of as a landscape lens, whether plano-convex or meniscus, cannot be corrected for spherical aberration, the rays from toward the margin coming to a focus nearer the lens than those from towards the centre. The only remedy for this, unless the image were to be received on a concave plate, is the placing of a stop at some distance in front of the lens, so as to cut off the objectionable marginal rays, and let the picture be formed only of such central pencils as come practically to a focus on one plane.

In the case of a compound lens, spherical aberration has to a large extent been eliminated, so that with a full working aperture, as fixed by the maker, it will, if of a good quality, produce a sharp image, but a sharp image of only such objects as are on one plane; an object at, say, twelve feet being perfectly sharp, while those at ten and fourteen are out of focus. This applies most particularly to portrait lenses, but in a less degree to most compound varieties, is generally spoken of as want of depth of focus, and remedied more or less in proportion to the size of the stop employed. This will be easily understood from a consideration of the fact that the rays from the upper and lower margins of, say, a lens of three inches diameter, cross or come to a focus at, say, a distance of eight inches, at a much wider angle than those from the upper and lower edges of, say, a half-inch stop, some-

thing, in fact, like as 20 to 3. To secure a sharp image of the rays crossing at the wider angle, the focusing screen must be placed exactly at the crossing point, while on those at the much smaller angle it may be moved for a certain distance to and fro without visibly affecting the sharpness. In other words, objects both in front and behind that which had been specially focused appear sufficiently sharp, and thus "depth of focus" is obtained.

Although the securing of depth of focus be the main object of the stop in a compuond lens, it also tends to flatten the field. Except in the case of the new "Anastigmat," it has been hitherto impossible to altogether eliminate spherical aberration from even the best type of compound lens, and although the depth of focus is not needed there, the small stop is absolutely essential to secure perfect marginal definition.

Of course, it goes without saying that the smaller the stop the less will be the light that is transmitted to the plate, and consequently the longer will be the exposure, but the amateur, and the professional also, as he is not unfrequently in blissful ignorance of the nature and properties of his lens, should remember that the size of the stop *per se* has no meaning, and only becomes intelligible when its relation to the focal length of the lens is known.

Stops, therefore, should always be thought of and spoken of in that relation, viz., as *f*–x, x being the proportion the aperture bears to the focus of the lens. Until a few years ago, each maker made the apertures of his stops according to his own fancy, although there was a kind of understanding that each smaller stop required twice the exposure of its next largest neighbor, but modern opticians generally adopt what is known as the U. S., or universal system.

The largest working aperture of the average portrait lens is one-fourth of its focal length, and the stop, consequently, is marked *f*–4. The U. S. takes that as the unit, and also marks it No. 1. A little calculation shows that if the aperture be reduced to 1 ½-fifths of the focal length, it will admit just half of the light admitted by the one-fourth, and it is marked *f*–5-6, with the U. S. No. 2, and so on through as many stops as can possibly be required.

Thus: *f*–8, No. 4; *f*–11-3, No. 8; *f*–16, No. 16; *f*–22-6, No. 32, *f*–32, No. 64; *f*–45-2, No. 128.

In this way, not only is the relation which each stop bears to the focal length of the lens shown, but also, the exposure required with any one stop on any particular plate being known, the time with any of the others is seen at a glance. For example, if it is known that *f*–22 needs two seconds, *f*–32 will need four, and *f*–16 only one; or if *f*–4 requires one second, then the U. S. numbers behind each stop give the respective number of seconds needed.

Amateurs whose lenses are not so marked could hardly take the trouble to alter the openings of their stops, but they should certainly ascertain the *f* value of each of them, so as to be able to communicate intelligibly with their brethren. The first step is, of course, to ascertain the equivalent focus of the lens. If a single one, all that is required is to focus carefully some distant object, and measure the distance between the back of the lens and the focusing screen. With a compound lens the operation is more complicated. There are various methods by which it can be accurately accomplished, some of which may be printed in the future, but in the meantime it may be managed with sufficient accuracy in a simple way. Focus, as in the case of a single lens, on a distant object, and measure the distance between the diaphragm slot and the focusing screen, which generally will be near enough for most practical purposes. Suppose the focus is found to be 10 inches; bring that that to tenths=100, and ascertain the number of tenths in each of the stops. Suppose one should be four-tenths; divide the 100 by 4, which will give 25, and shows that stop should be marked *f*–25, and so on with all the rest. A smaller fraction than a tenth, a sixteenth, or, better still, a millimeter, for the reduction of the focus and measurement of the stop, will admit of more refined measurements, but tenths will do very well.

Having thus laid the foundation, as focusing and the proper use of the stops go hand in hand, I now proceed to that important operation.

The first essential is a very fine ground glass. If the camera has not that, it may be improved by oiling, or, better still, by

rubbing in a solution of wax in turpentine, and rubbing off as much as possible. For very fine work a good plan is to cement with Canada balsam a microscopic glass cover in the centre of the focusing screen, and employ a focusing glass or Ramsden's eyepiece adjusted so that its focus falls exactly on the front of the focusing screen.

If the object in view be such as the copying of a map, whose sharpness to the edge is a *sine qua non*, the adjustments as to size, positions, etc., may be made with full aperture or a large stop, and then stops smaller and smaller must be put in and the image examined until the desired result is obtained.

For portraiture, sharpness all over the plate is not necessary, and sharp backgrounds not desirable. Therefore *f*–4 or *f*–8 should be used, and in the case of sitting figures, where the projecting knees may be out of focus when the head is in, the swing-back should be employed as a means of correction.

It is in landscape work, however, that focusing assumes almost the dignity of a science, and in which, from an art point of view, the use or abuse of the stop may make or mar a picture. Those whose only aim is to produce what are sometimes called topographical landscapes have only simple duties to perform—to ascertain the point from which the most pleasing composition can be obtained, focus sharply any prominent object, slip in stop *f*–32 or smaller, and give the necessary exposure. But pictures, or rather photographs, so produced are destitute of that which gives the greatest charm to a landscape—atmosphere; and as the various distances are all almost equally sharp, the unsatisfied eye wanders, like Noah's dove, from point to point without finding a place on which to rest.

The picture maker, or true photographic artist, has a different end in view. He wants to make a picture in which the eye shall be led to that which is its *motif* and made to rest there, corraled in from wondering, as it were, by the less sharply defined subordinate parts, while a kind of halo of mystery is suggested by the almost imperceptible atmospheric haze, rather felt than seen in the distance. He, too, like his topographical friend, places his

camera on the well-studied point of view, and knowing that the effect of a picture, when confined within the limits of the focusing screen, is often very different from that produced by looking at it in the open, carefully examines it with a large stop, or full aperture. Composition and light and shade satisfactory, and the *motif* clearly defined in his mind, the general effect is carefully studied, and, until he becomes indeed an experienced hand, tried with stops of various sizes and even by putting the principal points of the *motif* itself more or less out of focus. Far be it from me to recommend the principles of the "fuzzy school," but there *are* subjects that are improved by the removal of razor-edged sharpness.

Working on these lines, the photographic artist will find that the great majority of subjects will be most successfully and artistically photographed with stops varying from *f*–16 to *f*–22, and I may add that I have exhibited pictures that were both admired and medaled, and the only stop I carry is three inches of hard rubber having at one end an aperture *f*–16 and one *f*–22 at the other.—*Canadian Photographic Journal.*

Swiftness of a Sword Thrust.—The process of photo-chronography or the kindograph, is used with good effect for measuring the rapidity with which a sword or sabre is thrust.

The straight thrust is the most important in fencing, and only an expert will be able to thrust his sword quickly enough to take advantage of the uncovered position of his antagonist. To measure the rapidity with which this is done, the fencer is placed before a black background. The blade of the sword is covered with chalk, and a small ball of wax is stuck to the point of the same. The apparatus with its rotating disk is set in motion, the fencer makes his pass, and on the sensitive plate is marked, with utmost accuracy, the route described by each thrust.

In the case illustrated, there were nineteen passes, one following upon the other at an interval of one-fiftieth of a second. This is shown by the nineteen dots on the plate, and each pass has lasted, therefore, nineteen-fiftieths, or less than four-tenths of a second.

Aside from this, the plate also shows the curve described by the point of the sword, caused by the simultaneous movement of the right arm or leg of the fencer. Thus fencers can be compared with each other as to their adroitness, demonstrated by the impression on the plate.—*St. Louis Post-Dispatch.*

CELESTIAL PORTRAITURE.

THE New York *Sun* of the 12 ult. announces that the great and unprecedented job of officially photographing every Chinaman in the United States, under the authority of the Federal Government, has been begun, as provided for by the Act of Congress adopted in the month of May last, and signed by President Harrison, against the remonstrance of the Chinese Government, made through its Minister at Washington.

When this unprecedented job is done, our Government will be in possession of the photographs of the whole of the 130,000 (according to Porter's census) or 140,000 Chinese residents of the United States. In fact, it will have three photographs of each of them, for each and every one of them all is required by law to have three copies of his photograph taken, one copy to be deposited in the Federal archives, one copy to be held by the Internal Revenue Collector, and one copy to be retained by the photographed person. It is provided by the law, as expanded by Secretary Foster of the Treasury Department, that no tintype shall be accepted, and that genuine photographs, properly so called, shall be required in all cases.

Our Government will soon possess the most wonderful collection, the most gigantic pile of photographs ever taken by the order of the Government of any country in the world. It will be worthy of the inspection of ethnologists, mind readers, phrenologists, physiognomists, psychologists, contortionists, and all observant persons. It may be hard to discriminate between one Chinaman and any other; but we suppose that the difficulty can be overcome by close, careful, and persistent study of the faces through the aid of scientific appliances. We hold that the photographs ought to be classified. Those of the Chinamen who wear queues ought to be separated from those who do not; those who have been converted to Christianity should be separated from those who worship Joss. Such of them as play fan-tan or hit the pipe, should be separated from such as do not. Thus we would be assisted in making a scientific study of them all, and

in drawing deductions that might be useful or humorous. A great national museum ought to be established in which all the Chinese photographs might be seen in line on the walls.

But we are not only, under the new law, to have the photographs of all our 130,000 or 140,000 Chinamen; we are also to have the weight and height of every one of them; we are to have the age of each of them; we are to have the proper names of all of them, written either in the English alphabet or in Chinese characters. Still further, it is prescribed in Secretary Foster's regulations, issued under the authority of the Act of Congress passed in May last, that the "color of eyes" of every Chinaman in the Uuited States shall be given, so that he can be identified at any time by an Internal Revenue Collector.

When all these things, and several other things not here mentioned, have been done, each Chinaman shall be registered in the collection district in which he resides; the Collector shall give him a numbered and signed certificate; the number of the certificate, and the name of its holder shall be written across the photograph, and red ink only shall be used by the official writer. Thus it is prescribed in the official regulations issued by the Treasury Department and signed by Secretary Foster.

When a Chinaman has been photographed, weighed, and measured; when his optical and other peculiarities have been marked and recorded; when he has been registered and has got his certificate numbered in red ink; when he has paid the sum of $1 into the Treasury of the United States through the Internal Revenue Collector, then—then what? He shall, under Secretary Foster's regulations, "be lawfully entitled to remain in the United States."

As already announced, we have begun to enforce the new law adopted by Congress for the regulation of our Chinese residents. The Internal Revenue Collectors in the States of the Pacific coast where the Chinamen abound to the number of nearly 100,000, have begun to enforce it. The Collector of the Rochester district, in the State of New York is enforcing it this week. The Collectors of the 2d and 3d districts are almost ready to enter upon

the job of enforcing it in New York and Brooklyn, where there are four or five thousand Chinamen.

General Kerwin has ascertained that every Chinaman hereabout is perfectly willing to get his photograph taken, and pay out his $1 for a certificate. But we are not surprised to learn that the Chinese Minister at Washington is preparing to leave the country.

The Government of the United States never before undertook such a gigantic job in photography as it has now in hand, according to the statute enacted by Congress and under the regulations of the Treasury.

WANTS TO BE A PHOTOGRAPHER.

ANY one who has ever had editorial charge of a periodical, newspaper or magazine, knows how many communications reach the sanctum asking for advice and information. A photographic magazine is no exception. During the past month the following letter was received from an inland town in Pennsylvania. Inquiry proved the writer to be a responsible party, and that the communication was sent in good faith. With the exception of locality and signature we produce it *verbatim et literatim* for the amusement of our readers.

MISTER EDITER, SIR :

Please unt let me a know wat a complead fotegraf oudfits will cost me mabe camera, chememicals unt all complead to make picters wid from 3¼x4¼, 4x5, 4¼x6½, 6½x8½ i vould likes to stard in de bisness as i never had no expereance, vould likes you to gives me some informations i got 1 of your Journals unt looks dru de pak for were to puy one cameras unt uder dinks.

Now pleas unt dells me vich of dem cameras can i takes picture in a room wichout skye lite, tells me can i takes a buildings picture clear on cloudy weathers. pleas unt kin i takes gems & tintype wichone cameras i vold likes to take tintypes unt outher pictures pleace unt fine the price all complte how much money i want to start in do dink you can tel me all aboud id so i can makes a compleat pictures on my own expereances i am a mittle age man unt got a gute schul edeucations give me full information unt i vill starts rite in. yours—

BROMIDE ENLARGEMENTS FOR THE WORLD'S FAIR.

SEVERAL years ago the government decided to secure the originals or copies of all paintings, works of art and old books that pertained to the life of Columbus, the discovery of America and the events which were connected with that discovery. Artists were sent abroad to copy the famous paintings in European galleries, and to hunt for rare pictures which would throw light upon the historical scenes of Columbus' time. Accurate photographs were taken of paintings, old maps and statues, and a contract was then made with the Eastman kodak company at Rochester, N. Y., to enlarge these to attractive size.

The early home of Columbus in Genoa, the convent where he was educated, his appearance at the courts of Spain and Portugal, while endeavoring to secure aid in carrying out his voyage, and many scenes in Spain and Italy during that historic time, which were painted by celebrated artists of that period, are brought vividly to the eye by means of these photographs.

"Many of the photographs are natually indistinct, as the colors in the original paintings have become faded by time. A large number of the pictures were enlarged on bromide paper and finished in crayon. Many of the portraits were reproduced in oil, and some of the more striking pictures in water-colors and pastels. The average size of the enlarged picture was forty by fifty inches, but many of them are much larger. After the pictures have been shown at the World's Fair, they will probably be placed in the art museum of the Smithsonian Institute at Washington."

Perhaps the most interesting part of the collection is the different portraits of Columbus, of which there are nearly sixty. These were copied from the original paintings in the art galleries of Venice, Milan, Florence, Rome, Madrid, Lisbon, and other cities and represent the great navigator in youth, in middle life and old age. Some of the pictures give the discoverer the look of a Dominican monk, with lean and austere countenance, a high forehead and scanty locks of hair. In others he appears as a jolly round-faced sailor, apparently more fond of his grog than of discovering new continents.

It is not generally known that there is not an original portrait of Columbus in existence, and that the first picture of him was painted nearly fifteen years after his death, and from descriptions furnished the artists by his former friends and associates. Perhaps the most famous of these is the Giovio portrait, as it is called. About the period when this was painted, several eminent artists in other countries also made portraits of Columbus. It is not improbable that they received their information as to his personal appearance from the same sources, and as there is a marked resemblance between several of these paintings, it is evident that they are fairly correct. The Yonez and Rincon pictures of the court of Spain are the oldest in that country, and are claimed by that government to be authentic. Another famous portrait is the one which hangs in the palace of the Ministry of Marine at Madrid.

The photographs of these noted paintings represent Columbus to have been a man of medium height, with aquiline nose, high forehead, and a face that was marked with much intelligence and individuality.

The collection also contains photographs of the maps drawn by Columbus and his contemporaries of the new world. In some, South America has the shape of a large round apple, but in the last one drawn by Columbus, the outline of the coast and the appearance of the country is accurately described. In the first chart of the West Indies, drawn by Juan La Cosa, Columbus' pilot, he is represented as bearing the Christ-child across the Atlantic, symbolic of carrying salvation to the new world.

There are also many quaint pictures or scenes in the New World which were painted by European artists from the descriptions brought back by the first voyagers. The strange appearance of the natives, the vast forests of the new country, and the animals, many of which are portrayed with human heads and faces, are to be seen in many grotesque pictures.

Many of the maps and books sent to the company to be photographed were loaned to the United States by Spain and Italy, and were very rare and valuable. They were all insured by the government while they remained in Rochester. An old and stained book of charts bound in ox-hide, which dated back to 1520, was alone insured for $15,000.

THE PHOTOGRAPHIC SOCIETY OF JAPAN.

THE annual meeting of the society was held on Friday, May 13th, in the rooms of the Geographical Society of Japan, Nishikonya-cho, Tokyo.

There was an exhibition of work by members and of apparatus, during the day time. Amongst other things were shown a large collection of the most modern apparatus by Mr. R. Konishi. A set of photographs, on porcelain, excellently reproduced. The Secretaries did not receive any note of the maker of these enamels, and would like to hear from him. A series of fine prints on gelatino-citro-chloride paper by Mr. G. Brinkworth, and an album of the Tokaido by Mr. K. Ogawa.

At 5 p. m. there was a meeting for the election of Officers, and for other formal business, Viscount Okabe, Vice President of the Secretary, in the chair.

The minutes of the last meeting having been read and approved, the Chairman called on the Secretaries to read their report for the past year, which they accordingly did.

The Officers for the past year having retired, it was proposed by Professor Kikuchi, that they be all re-elected, and they were re-elected accordingly.

It was proposed by Professor Kikuchi, seconded by Professor C. D. West, that Count T. Toda and Dr. E. Divers, F. R. S., etc., be elected Vice-Presidents of the Society. They were unanimously elected.

Mr. C. D. West then read a short paper on "A new toning process for silver prints." This process is simplicity itself. The prints must be on plain paper. They are printed in the usual way, are fixed, and are then thoroughly washed. After this they are dipped in a solution of sulphuretted hydrogen till they reach the tone wished for. Prints were shown that were of an excellent tone. Mr. West said that probably photographers would think that such prints were, of necessity, the reverse of permanent; but he saw no reason to think so. Sulphide of silver was really the most permanent silver salt he knew of. As a matter of fact he had failed to make any alteration on prints, either by dampness or by the action of light during one year.

After this paper was read, Prof. W. K. Burton exhibited the action of a very novel form of optical lantern that had been brought from America by Dr. A. B. de Guerville. This apparatus, although occupying little more room than an ordinary lime light lantern, distils its own oxygen and hydrogen-substitute as the exhibition goes on. Considering that the gear was in the hands of a lanternist of but slight expe-

rience, and that it was tried by him only for the fourth time; it worked with remarkable smoothness. The light was of extreme brilliancy, and the audience seemed to highly appreciate a set of scenes that were projected on the screen.

The proceedings terminated with a vote of thanks to the Chairman.

Behavior of Aluminum towards Mercury.—Helbig makes the following communication on this subject to the *Pharm. Centralhalle :*

If a little mercuric chloride (or other mercuric salt) is placed upon a piece of metallic aluminum, white, hair-like formations will at once be seen to rise from the surface. These grow during a short time considerably (several centimetres during about fifteen minutes). They are generally so fine that they can be blown away. To succeed with this experiment the aluminum must be at least moderately clean.

The reaction may be employed for purposes of amusement. A very handsome result is obtained if the recently-introduced aluminum penholders, having the form of bird's feathers, are coated with a strong solution of mercuric chloride. This will cause apparently additional feathers to grow out of the metallic one.

The reaction may also be used as an example of the inconsistency of the assumed law that bodies act upon each other only in a liquid condition, since the same phenomenon is observed, no matter what liquid is used for dissolving the mercuric salt. On the other hand, when dry mercuric chloride is applied to metallic aluminum, the formation of "hairs" occurs even more rapidly than when solutions are employed.

The nature of the reaction is this: First an aluminum amalgam is formed. Next the aluminum dissolved by the mercury is oxidized by the air and converted into alumina; this is shown by the fact that when a piece of aluminum is put in a solution of mercuric chloride, metallic mercury is separated. On the other hand, the "hairy" feathers are not formed if the reaction is attempted with exclusion of air.

He—"Had my photo taken at Sereno's the other day."

She—"Yes. I saw it."

He—"Ethel thought it rather insipid in expression."

She—"I don't know. I thought it very characteristic of you."
—*Harpers.*

The Editorial Dropshutter.

THE recent announcement of the Steinheil firm that they will fit to any good lens a negative element, which will transform it into a telephotographic lens, is suggestive. Many of our readers will find that they possess a variety of combinations in the lenses which they have at hand. The great difficulty is to know how to form these combinations. Many a boating trip might be enlivened by the addition of the eye-piece from an opera glass to the ordinary camera lens, enabling the operator to catch a distant sail or shore. But to adapt one lens to another in this manner requires either a tedious series of experiments or some knowledge of photographic optics. Photographic science does not stand alone as the science without drudgery. And we venture the assertion that those of our readers who find some time to devote to the study of the opticial properties of the lenses they are using will find the work thus spent gives only added keenness to the delight of their photographic recreations. Lenses, so far from being dry and dull, are filled with "points" of interest, and points upon which many an interesting discussion might focus.

We have bureaus for comparison of thermometers, bureaus for standardizing electrical instruments, and bureaus for the comparison of weights and measures.

Is there in America a demand for a bureau to which one can send a lens to be examined as regards its definition, distortion, focal length etc.,—indeed as regards any or all its optical properties and optical "constants"?

Such an establishment would naturally have its headquarters in some of our physical laboratories, such as the thermometric bureau at Yale or the department for comparison of electrical standards at the Johns Hopkins University.

An academic institution would make its charges merely nominal, and would guarantee freedom from commercial bias. From private information we have reason to think that such a bureau may be opened in the near future if there be such a demand.

Our columns are open for expression of opinion on this subject, from users and makers of lenses.

OUR esteemed Canadian contemporary in its number for June, publishes a paper on "Working Aristo" above the signature of A. E. Lyon. In the introduction we recognize page one hundred and forty-five of the AMERICAN JOURNAL OF PHOTOGRAPHY, taken almost verbatim, We do not object to the incorporation of our matter, but when a page is taken solid, it would be but courtesy to give due credit where it belongs.

Photographic Scissors and Paste.

A Cape May Episode.—"Little Willie, the kodak fiend," at Cape May, landed in a pot of trouble the other day through too promiscuous desire to secure a lasting impression of the many sights in view. All during bathing hour he wandered about the crowd gathered on the beach at the Congress bathing grounds. He would take a snap here and another one there. This tempting bit or that pretty shape would be gathered with a view of gloating over it some time in the future.

At last Willie came to grief. Upon one particular young woman he had had his eye for several days waiting anxiously for the time when she would venture in the surf. To-day he was overjoyed to catch sight of her on the beach. This was his chance, and he made all preparations to take advantage of it. However, he failed to notice the particularly stalwart escort. Willie had eyes only for the young woman, while the escort was keenly watching Willie. The latter's face told of his joy, he was brimful of smiles; he had a focus on the object of his admiration. Then a change came over the spirit of his dreams. There was a snap, but it was not like the ominous click of the kodak, it was more in the nature of a rattle. The stalwart escort had slipped up unseen, and his right duke landed on Willie's jaw bone. No arrests were made, and, for the time being at least, Willie is not in the photograph business.

The greatest refracting telescopes yet known are made by Alvan G. Clark, of Cambridgeport, Mass. So fine is the work required on the lenses of these instruments that the glassmakers commenced work on two disks, from which a 40-inch lens is to be made, four years ago, and only one has, as yet, been sent to Mr. Clark. If there is the most minute speck of any kind in the glass it is rejected. A disk 40 inches in diameter and 10 inches thick costs $8000. After Mr. Clark has determined what curve to give the glass, an iron casting is made of the size and shape required. The disk is revolved upon this and ground with steel crushings. Next, eight courses of emery and an adjustable tool are used, and at this stage measurements are made with an instrument that measures one thirty-thousandth of an inch. The final shaping is made with beeswax and rouge, and even the bare thumb does its part in the polishing. The lens must be so exact in its curve that every ray striking it shall centre at a predetermined mathematical point.—*Public Opinion.*

The Amateur Photographers Get Together.—Thirty-six delegates representing twenty-one amateur photographers' clubs in various parts of the United States met at the rooms of the Society of Amateur Photographers of New York, 113 West Thirty-eight Street, on July 21st, and approved of the plan, and adopted a constitution and the name of the American League of Amateur Photographers.

The league is patterned in many respects after the league of American Wheelmen. It is established to bring about a closer union between camera societies, to promote the science and art of photography, to encourage and advance photography separate from its trade, commercial or professional relations, and to bring members into closer relationship in acquiring useful information.

A division will be organized in each State, and a national council will be held in May, 1893, to consist of three delegates and three alternates from each club. State divisions will appoint local officers in each town or centre, who will secure privileges and advantages, and furnish information to a member on presentation of his membership card. Arrangements will be made with hotels to furnish dark rooms and other conveniences for photographers. The league will publish a journal, and the new organization will take the place of the American Photographic Conference. It is proposed to secure to members a special discount in purchasing photographic materials. The membership dues will be one dollar yearly, and can be forwarded to the General Secretary, T. J. Burton, 113 W. Thirty-eighth St., New York.

Officers of the National Council were elected yesterday as follows:—President—Paul L. V. Thiery, Newark (N. J.) Camera Club; First Vice President—Dr. George L. Parmele, Camera Club of Hartford, Conn.; Second Vice President—Frances B. Johnson, Washington (D. C.) Camera Club; Treasurer—W. H. Drew, Lynn (Mass.) Camera Club; Secretary—T. J. Burton, Society of Amateur Photographers of New York.

The New York division of the league was organized at the Amateur Society's rooms last night, and these officers were elected:—President—Frank La Manna, Brooklyn Academy of Photography; First Vice President—Dr. Ely Van Der Walker, Syracuse Camera Club; Second Vice President—James H. Stebbins, Jr., New York Society of Amateur Photographers; Secretary-Treasurer—H. S. Fowler, Brooklyn Academy of Photography.

The earlier editions of the kodak now repose in pawn shop windows.

Literary and Business Notes.

"BECAUSE IT DIDN'T PAY."

He had traveled through Sahara, braved
the dangers of the Nile,
Defeated enraged Mussulmen and dined
on crocodile;
Knew everything of politics, religion, and
the law,
Could box and fence and scull a race and
please his mother-in-law—
In short, had all accomplishments of men
both great and wise.
But he couldn't run a business, for he
wouldn't advertise.

—*John R. Barrett.*

IN ARCTIC SEAS, OR THE VOYAGE OF THE KITE. By Robert N. Keely, Jr., M. D., and G. G. Davis, M. D. With map and illustrations. Philadelphia: Edward Stern & Co.

THE authors of this book are singularly fortunate in their choice of theme; they may also be congratulated upon their auspicious conduct of this narrative of the voyage of the "Kite" with the Peary Expedition to North Greenland.

The departure of the Kite with the relief expedition, which it is hoped will rescue the little band of explorers who were left to winter in the far north, has reawakened the interest developed by the departure of the original expedition. The circumstances relating to the journey were such as to excite a lively concern for the fate of the tiny party who were put ashore on the edge of McCormick Bay; for, apart from any consideration of personal feeling, it is obvious that Lieutenant and Mrs. Peary have done much to supply types of character closely associated with our national feeling and predilection.

"In Arctic Seas" is based upon the personal diary of Dr. Keely, Surgeon of the expedition sent by the Academy of Natural Science to accompany Lieutenant Peary, but much additional material has been incorporated.

The "narrative" reviews the whole journey of the Kite from the time she left her dock in Brooklyn to her return to St. John's, Newfoundland. The members of her crew had all the experience described by Arctic travelers, with scarcely any of their accompanying dangers. Ice-bound within two weeks of their departure, the gallant little ship forced its way through miles of ice to the "north water," as the sailors call it, and safely carried the explorers home again in little more than three months from the time they started, after reaching a point within a few miles of Kane's winter quarters, and but 600 miles from the pole. But one unfortunate incident is recorded, the breaking of Lieutenant Peary's leg while in the ice, and from first to last the voyage appears to have been an ideal holiday.

The book is printed on heavy paper and is illustrated both by photographs and pen sketches. Among the former are excellent portraits of Lieutenant and Mrs. Peary.

THE *Optical Magic Lantern Journal and Photographic Enlarger*, J. Hay Taylor, Editor, have removed their offices from Salisbury Square, E. C., to 55 and 56 Chancery Lane, W. C., London, to which address all communications should be addressed.

THERE is a moral dignity in minding one's own business to which you can attain. Solomon says that he who meddles with business not belonging to him is like him who taketh a dog by the ears; whereas he who pursues a contrary course is like him who sits down to a good meal with no one to make him afraid.